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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,078	12/11/2003	Kenneth S. Murphy	MP333	7966

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ECKERT SEAMANS CHERIN & MELLOTTT, LLC
ALCOA TECHNICAL CENTER,
100 TECHNICAL CENTER DRIVE
ALCOA CENTER, PA 15069-0001

EXAMINER

ROE, JESSEE RANDALL

ART UNIT	PAPER NUMBER
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1733

MAIL DATE	DELIVERY MODE
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03/09/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/734,078

Applicant(s)

MURPHY, KENNETH S.

Examiner

JESSEE ROE

Art Unit

1733

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-15 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-15 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8 February 2011.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 8 February 2011 has been entered.

Status of the Claims

Claims 11-15 and 17 are pending wherein claims 11 and 13 are amended and claims 1-10 and 16 are canceled.

Status of Previous Rejections

The previous rejection of claims 11-15 under 35 U.S.C. 103(a) as being unpatentable over Nishihata et al. (JP 2000-042755) in view of Warnes et al. (US 5,989,733) is withdrawn in view of the decision by the Board of Patent Appeals and Interferences set forth on 20 December 2010. The previous rejection of claims 11 and 17 under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Warnes et al. (US 5,989,733) is withdrawn in view of the Applicant's amendment to

claim 11. The previous rejection of claims 11 and 17 under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 3,832,167) in view of Warnes et al. (US 5,989,733) is withdrawn in view of the Applicant's amendment to claim 11. The previous rejection of claims 11 and 17 under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Spitsberg et al. (US 6,551,423) is withdrawn in view of the Applicant's amendment to claim 11. The previous rejection of claims 11 and 17 under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 3,832,167) in view of Spitsberg et al. (US 6,551,423) is withdrawn in view of the Applicant's amendment to claim 11.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-13 and 17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Murphy (US 5,856,027).

In regards to claims 11-13 and 17, Murphy ('027) discloses a nickel base superalloy (René alloy N5) that would be used for making SC turbine blades and vanes having a composition relative to that of the instantly claimed alloy as shown below (col. 3).

Element	Instant Claims (weight percent)	Murphy ('027) (weight percent)	Overlap
Cr	about 3 – 12	7.0	7.0
Co	0 – about 15	7.5	7.5
Mo	0 – about 3	1.5	1.5
W	about 3 – 10	5.0	5.0
Re	0 – about 6	3.0	3.0
Al	about 5 – 7	6.2	6.2
Ti	0 – about 2	0	0
Fe	0 – about 1	0	0
Nb	0 – about 2	0	0
Ta	about 3 – 12	6.5	6.5
C	0 – about 0.07	0.05	0.05
Hf	about 0.03– 0.80	0.15	0.15
Zr	0 – about 0.10	0	0
B	0 – about 0.02	0	0
REM	0 – about 0.05	0.018 (Y)	0.018 (Y)

*REM = Rare earth element

With respect to the "incidental impurities" present in the alloy in line 9 of claim 11, the Examiner asserts that the alloy disclosed by Murphy ('027) would have incidental impurities.

With respect to the amended recitation "an outwardly grown single phase platinum-modified diffusion aluminide bondcoat on the substrate, and a ceramic thermal barrier coating comprising zirconia disposed on the bondcoat wherein spallation life of the ceramic thermal barrier coating during cyclic oxidation is prolonged" in lines 9-13 of

claim 11, Murphy ('027) teaches a non-stoichiometric single phase platinum modified diffusion aluminide bondcoat that would be outwardly grown (col. 3, lines 1-10, col. 5, lines 22-28 and col. 8, lines 10-21) on top of which there is an alumina layer and a ceramic thermal barrier layer wherein the ceramic thermal barrier would comprise yttria stabilized zirconia and this coating system would provide improved spallation life during cyclic oxidation (col. 6, lines 42-56, col. 7, line 54 - col. 8, line 21, claims 7 and 11).

Alternatively, Murphy ('027) teaches that other nickel base superalloy that can be used for SC turbine blades and vanes would include MarM247, CMSX-4, PWA 1422, PWA 1480, PWA 1484, René 80, René 142, and SC 180. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the René alloy N5 nickel base alloy from the group of MarM247, CMSX-4, PWA 1422, PWA 1480, PWA 1484, René 80, René 142, and SC 180 since these alloy would be equivalent for use as turbine blades. MPEP 2144.08 (II)(4)(a).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murphy (US 5,856,027) as applied to claim 11 above alone, or alternatively further in view of Allen et al. (US 5,346,563).

In regards to claim 14, Murphy ('027) discloses the composition of a René alloy N5 (nickel base alloy) wherein sulfur is not specified in the disclosed composition. Therefore, it would be expected that the lower limit for sulfur in Murphy ('027) would be 0 weight ppm and therefore the sulfur content of Murphy ('027) overlaps in scope with claim 14. MPEP 2144.05 I. Alternatively, Murphy ('027) does not specify the sulfur content of the René alloy N5 (nickel base alloy).

Allen et al. ('563) teaches reducing the sulfur level below 1 ppm in nickel base superalloys by heating in the presence of MgO at a temperature at which sulfur becomes mobile in order to have excellent oxidation resistance (col. 2, line 50 – col. 3, line 27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the composition before applying the coating system, as disclosed by Murphy ('027), by reducing the sulfur level below 1 ppm by heating in the presence of MgO at a temperature at which sulfur becomes mobile, as disclosed by Allen et al. ('563), in order to have excellent oxidation resistance, as disclosed by Allen et al. ('563) (col. 2, line 50 – col. 3, line 27).

Claims 11-12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Murphy (US 5,856,027).

In regards to claims 11, 15 and 17, Gell et al. ('723) discloses a nickel-base superalloy that would be used for gas turbine blades having a composition relative to that of the instant invention as shown in the table on the following page (col. 4, line 63 –

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col. 5, line 6).

Element	Instant Claims (weight percent)	Gell et al. ('723) (weight percent)	Overlap
Cr	about 3 – 12	5 – 18	5 – about 12
Co	0 – about 15	0	0
Mo	0 – about 3	0	0
W	about 3 – 10	0 – 15	about 3 – 10
Re	0 – about 6	0 – 7	0 – about 6
Al	about 5 – 7	2 – 8	about 5 – 7
Ti	0 – about 2	1 – 5 (optional with Al)	1 – about 2
Fe	0 – about 1	0	0
Nb	0 – about 2	0	0
Ta	about 3 – 12	0 – 12	about 3 – 12
C	0 – about 0.07	0 – 50 ppm	0 – 50 ppm
Hf	about 0.03– 0.80	0 – 3.5	about 0.03– 0.80
Zr	0 – about 0.10	0	0
B	0 – about 0.02	0 – 50 ppm	0 – 50 ppm
REM	0 – about 0.05	0	0

*REM = Rare earth element

The Examiner notes that the amounts of chromium, cobalt, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements disclosed by Gell et al. ('723) overlaps the amounts of chromium, cobalt, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements in the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the claimed amounts of chromium, cobalt, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements from the amounts disclosed by Gell et al. ('723) because Gell et al. ('723) discloses the same utility throughout the disclosed ranges.

Gell et al. ('723) discloses a nickel-base superalloy as shown above, but Gell et al. ('723) does not specify that the alloy would include an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Murphy ('027) teaches a non-stoichiometric single phase platinum modified diffusion aluminide bondcoat that would be outwardly grown (col. 3, lines 1-10, col. 5, lines 22-28 and col. 8, lines 10-21) on top of which there is an alumina layer and a ceramic thermal barrier layer that would comprise yttria stabilized zirconia and when applied to nickel base superalloy turbine blade compositions this coating system would provide improved spallation life during cyclic oxidation (col. 3, lines 42-57, col. 6, lines 42-56, col. 7, line 54 - col. 8, line 21, and claims 7 and 11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the coating system, as disclosed by Murphy ('027), to the nickel base superalloy blade composition, as disclosed by Gell et al. ('723), in order to improve spallation life of the turbine blade during cyclic oxidation, as disclosed by Murphy ('027) (col. 3, lines 42-57, col. 6, lines 42-56, col. 7, line 54 - col. 8, line 21, and claims 7 and 11).

With respect to the recitation "wherein the rare earth element is selected from the group consisting of Y and lanthanide series elements with atomic numbers from 58 to 71" in claim 12, the Examiner notes that claim 11, from which claim 12 depends recites "up to about 0.050% of a rare earth element". Therefore, neither claim 11 nor claim 12 require the presence of a rare earth element.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gell et al. (US 4,116,723) in view of Murphy (US 5,856,027) as applied to claim 11 above alone, or alternatively further in view of Allen et al. (US 5,346,563).

In regards to claim 14, Gell et al. ('723) in view of Murphy ('027) disclose a nickel based alloy having a composition as set forth above wherein the sulfur is not specified. Therefore, it would be expected that the lower limit for sulfur in Gell et al. ('723) in view of Murphy ('027) would be 0 weight ppm and therefore the sulfur content of Gell et al. ('723) in view of Murphy ('027) overlaps in scope with claim 14. MPEP 2144.05 I. Alternatively, Gell et al. ('723) in view of Murphy ('027) does not specify the sulfur content of the nickel based alloy

Allen et al. ('563) teaches reducing the sulfur level below 1 ppm in nickel base superalloys by heating in the presence of MgO at a temperature at which sulfur becomes mobile in order to have excellent oxidation resistance (col. 2, line 50 – col. 3, line 27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the composition before applying the coating system, as disclosed by Gell et al. ('723) in view of Murphy ('027), by reducing the sulfur level below 1 ppm by heating in the presence of MgO at a temperature at which sulfur becomes mobile, as disclosed by Allen et al. ('563), in order to have excellent oxidation resistance, as disclosed by Allen et al. ('563) (col. 2, line 50 – col. 3, line 27).

Claims 11-13, 15 and 17 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Shaw et al. (US 3,832,167) in view of Murphy (US 5,856,027).

In regards to claims 11-13 and 17, Shaw et al. ('167) discloses a nickel-base superalloy that would be used for gas turbine blades having a composition relative to that of the instant invention as shown in the table below (col. 1, line 23 – col. 2, line 15).

Element	Instant Claims (weight percent)	Shaw et al. ('167) (weight percent)	Overlap
Cr	about 3 – 12	5 – 13	5 – about 12
Co	0 – about 15	0	0
Mo	0 – about 3	1 – 7	1 – about 3
W	about 3 – 10	0 – 12	about 3 – 10
Re	0 – about 6	0	0
Al	about 5 – 7	4.5 – 7	about 5 – 7
Ti	0 – about 2	0 – 5	0 – about 2
Fe	0 – about 1	0	0
Nb	0 – about 2	0 – 4	0 – about 2
Ta	about 3 – 12	0 – 5	about 3 – 5
C	0 – about 0.07	0.03 – 0.2	0.03 – about 0.07
Hf	about 0.03 – 0.80	0.3 – 1.5	about 0.3 – 0.80
Zr	0 – about 0.10	0.02 – 0.7	0.02 – about 0.10
B	0 – about 0.02	0.001 – 0.01	0.001 – 0.01
REM	0 – about 0.05	0.008 – 0.08 (Y)	0.008 – about 0.05

*REM = Rare earth element

The Examiner notes that the amounts of chromium, cobalt, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements disclosed by Shaw et al. ('167) overlaps the amounts of chromium, cobalt, molybdenum, tungsten, rhenium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements in the instant invention, which is *prima facie* evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the claimed amounts of chromium, cobalt, molybdenum, tungsten,

rhodium, aluminum, titanium, iron, niobium, tantalum, carbon, hafnium, zirconium, boron and rare earth elements from the amounts disclosed by Shaw et al. ('167) because Shaw et al. ('167) discloses the same utility throughout the disclosed ranges.

Shaw et al. ('167) discloses a nickel-base superalloy as shown above, but Shaw et al. ('167) does not specify that the alloy would include an outwardly grown aluminide bondcoat and a ceramic thermal barrier coating disposed on the bondcoat wherein the life of the ceramic thermal barrier coating during cyclic oxidation would be prolonged.

Murphy ('027) teaches a non-stoichiometric single phase platinum modified diffusion aluminide bondcoat that would be outwardly grown (col. 3, lines 1-10, col. 5, lines 22-28 and col. 8, lines 10-21) on top of which there is an alumina layer and a ceramic thermal barrier layer that would comprise yttria stabilized zirconia and when applied to nickel base superalloy turbine blade compositions this coating system would provide improved spallation life during cyclic oxidation (col. 3, lines 42-57, col. 6, lines 42-56, col. 7, line 54 - col. 8, line 21, and claims 7 and 11).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to apply the coating system, as disclosed by Murphy ('027), to the nickel base superalloy blade composition, as disclosed by Shaw et al. ('167), in order to improve spallation life of the turbine blade during cyclic oxidation, as disclosed by Murphy ('027) (col. 3, lines 42-57, col. 6, lines 42-56, col. 7, line 54 - col. 8, line 21, and claims 7 and 11).

With respect to the recitation "wherein the Hf concentration of the substrate is from about 0.33% to about 0.80% by weight" in claim 15, Shaw et al. ('167) teaches 0.3

to 1.5 weight percent hafnium which encompasses the claimed range of hafnium(col. 1, line 48 – col. 2, line 15).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. (US 3,832,167) in view of Murphy (US 5,856,027) as applied to claim 11 above alone, or alternatively further in view of Allen et al. (US 5,346,563).

In regards to claim 14, Shaw et al. ('167) in view of Murphy ('027) disclose a nickel based alloy having a composition as set forth above wherein the sulfur is not specified. Therefore, it would be expected that the lower limit for sulfur in Shaw et al. ('167) in view of Murphy ('027) would be 0 weight ppm and therefore the sulfur content of Shaw et al. ('167) in view of Murphy ('027) overlaps in scope with claim 14. MPEP 2144.05 I. Alternatively, Shaw et al. ('167) in view of Murphy ('027) does not specify the sulfur content of the nickel based alloy

Allen et al. ('563) teaches reducing the sulfur level below 1 ppm in nickel base superalloys by heating in the presence of MgO at a temperature at which sulfur becomes mobile in order to have excellent oxidation resistance (col. 2, line 50 – col. 3, line 27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the composition before applying the coating system, as disclosed by Shaw et al. ('167) in view of Murphy ('027), by reducing the sulfur level below 1 ppm by heating in the presence of MgO at a temperature at which sulfur becomes mobile, as disclosed by Allen et al. ('563), in order to have excellent oxidation resistance, as disclosed by Allen et al. ('563) (col. 2, line 50 – col. 3, line 27).

Response to Arguments

Applicant's arguments with respect to claims 11-15 and 17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jessee Roe/
Examiner, Art Unit 1733